

Amendments to the Specification:

Please amend the specification as follows:

Please replace paragraph number [0029], with the following rewritten paragraph:

[0029]

When a rotation angle of a rotation detection target is θ_0 , the rotation angle converter converts the output of the rotation detecting means containing a ripple having an amplitude of "a" (the symbol "a" is italicized in mathematical expressions in this specification) to a rotation angle output θ , which is expressed by following Expression 2:

$$\theta = \theta_0 - a \cos(n\theta_0 + \phi) \quad \underline{\theta = \theta_0 - a \cos(m\theta_0 + \phi)} \dots \text{ (Expression 2)}$$

where "m" is a ripple periodic number per rotation of the detection target, and " ϕ " is an initial phase difference caused by mounting of the rotation detecting means to the rotation detection target.

Please replace paragraph number [0030], with the following rewritten paragraph:

[0030]

In the present invention, for instance, the angular velocity converter differentiates " θ " with respect to time to obtain an angular velocity output ω , which is expressed by the following Expression below (" θ " with a dot denotes the time differentiation of " θ ", and may be represented in this specification by " θ dot" due to the limitation of the patent application format.):

$$\omega = \dot{\theta}_0 (1 + a \sin(n\theta_0 + \phi)) \quad \underline{\omega = \dot{\theta}_0 (1 + a \sin(m\theta_0 + \phi))} \dots \text{ (Expression 3)}$$

Please replace paragraph number [0031], with the following rewritten paragraph:

[0031]

If the rotation calculating means calculates its output " ω_{out} " in accordance with Expression 1, Expressions 2 and 3 may be substituted into Expression 1 to express " ω_{out} " as follows:

$$\underline{\omega_{out} = \dot{\theta}_0 (1 - G \sin(\psi - am \cos(n\theta_0 + \phi) + n\theta_0) + am \sin(n\theta_0 + \phi) - amG \sin(\psi - am \cos(n\theta_0 + \phi) + n\theta_0) \sin(n\theta_0 + \phi))}$$

$$\underline{\omega_{out} = \dot{\theta}_0 (1 - G \sin(\psi - am \cos(m\theta_0 + \phi) + m\theta_0) + am \sin(m\theta_0 + \phi) - amG \sin(\psi - am \cos(m\theta_0 + \phi) + m\theta_0) \sin(m\theta_0 + \phi))}$$

... (Expression 4)

Please replace paragraph number [0032], with the following rewritten paragraph:

[0032]

In Expression 4, the ripple amplitude is generally small, and thus it can be considered that "a" << 1. Thus, Expression 4 may be expanded while the trigonometric functions are subjected to linear approximation near an angle of zero to obtain the following expression:

$$\underline{\omega_{out} = \dot{\theta}_0 (1 - G \sin(\psi + n\theta_0) + amG \cos(\psi + n\theta_0) \cos(n\theta_0 + \phi) + am \sin(n\theta_0 + \phi) - amG \sin(\psi - am \cos(n\theta_0 + \phi) + n\theta_0) \sin(n\theta_0 + \phi))}$$

$$\underline{\omega_{out} = \dot{\theta}_0 (1 - G \sin(\psi + m\theta_0) + amG \cos(\psi + m\theta_0) \cos(m\theta_0 + \phi) + am \sin(m\theta_0 + \phi) - amG \sin(\psi - am \cos(m\theta_0 + \phi) + m\theta_0) \sin(m\theta_0 + \phi))}$$

... (Expression 5)

Please replace paragraph number [0033], with the following rewritten paragraph:

[0033]

Assuming that "aG = 0", the following Expression may be obtained:

$$\omega_{out} = \dot{\theta}_0(1 - G \sin(n\theta_0 + \psi) + am \sin(m\theta_0 + \phi))$$

$$\underline{\omega_{out} = \dot{\theta}_0(1 - G \sin(n\theta_0 + \psi) + am \sin(m\theta_0 + \phi)) \dots \text{(Expression 6)}}$$

Expression 6 indicates that the output " ω_{out} " of the rotation calculating means is equal to the angular velocity " $\dot{\theta}_0$ " if the detection target if the amplitude adjusting gain "G" is set to be equal to the ripple content "am" and if the phase adjusting value " ψ " is set to be equal to the initial phase difference " ϕ ". It means that the ripple contained in the output of the rotation angle detection means can be eliminated.

Please replace paragraph number [0034], with the following rewritten paragraph:

[0034]

The angular velocity ripple component " ω_r " per unit angular velocity contained in the rotation detection device may be given by the following Expression 7:

$$\underline{\omega_r = am \sin(m\theta_0 + \phi) \dots \text{(Expression 7)}}$$

Please replace paragraph number [0035], with the following rewritten paragraph:

[0035]

Therefore, when a compensation angular velocity ripple " ω_c " per unit angular velocity that may be given by the following Expression 8 is added to the angular velocity ripple " ω_r ",

$$\underline{\omega_c = -G \sin(n\theta + \psi) \dots \text{(Expression 8)}}$$

the synthesized angular velocity ripple " ω_m " per unit angular velocity obtained after compensation may be expressed by the following Expression 9:

$$\underline{\omega_m = \sqrt{(n\theta)^2 + G^2 + 2n\theta GB \cos(\phi - \Psi)} \sin(n\theta + \Omega)}$$

$$\underline{\omega_m = \sqrt{(ma)^2 + G^2 - 2maGB \cos(\phi - \psi)} \sin(m\theta + \Omega)} \dots \text{ (Expression 9)}$$

where

$$\underline{-\tan\Omega = \frac{-n\theta \sin\phi + G \sin\Psi}{n\theta \cos\phi + G \cos\Psi}}$$

$$\underline{\tan\Omega = \frac{ma \sin\phi - G \sin\psi}{ma \cos\phi - G \cos\psi}} \dots \text{ (Expression 10)}$$

Please replace paragraph number [0036], with the following rewritten paragraph:

[0036]

If " $\phi = \Psi$ " in Expression 9, ω_m is expressed by the following Expression 11:

$$\underline{\omega_m = (n\theta + G) \sin(n\theta + \Psi)}$$

$$\underline{\omega_m = (ma - G) \sin(m\theta + \Psi)} \dots \text{ (Expression 11)}$$

Please replace paragraph number [0038], with the following rewritten paragraph:

[0038]

Then, when " ω_c " and " ω_m " have the same phase, the increase/decrease in Ψ is zero.

Further, the phase " ψ " may be defined by the following Expression 13:

$$\Psi(n+1) = \alpha \sum_{k=1}^n e_2(k) \dots \text{ (Expression 13)}$$

where $e_1(n)$ is the deviation, from zero, of a time differential or a time integral of " ω_m " which is sampled when the angle " $m\theta + \psi$ ", which is the angle of " ω_c ", is " $2n\pi + 3\pi/2$ "; α " is an appropriate gain.

Thus, " ψ " may be defined, in connection with the change in the angle " $m\theta + \Phi$ " " $m\theta + \psi$ " from 0 to 2π , by the following Expression 14:

$$\Psi(n+1) = \alpha \left(\sum_{k=1}^n e_1(k) - \sum_{k=1}^n e_2(k) \right) \dots \text{(Expression 14)}$$

Please replace paragraph number [0040], with the following rewritten paragraph:

[0040]

Under such a definition, if " $\phi = \psi$ ", the increase/decrease in "G" is zero when the half-cycle time average value of " ω_m " is equal to " $\omega_{mAV1}(n)$ ". When the " ω_c " angle " $m\theta + \Phi$ " changes from " $2n\pi + \pi$ " to " $2n\pi + 2\pi$ ", "G" may be defined by the following Expression 16:

$$G(n+1) = \beta \sum_{k=1}^n \left(\frac{1}{T_2(k)} \int_{(2k\pi+\pi)}^{(2k\pi+2\pi)} \omega_m dt - \omega_{mAV2}(k) \right) \dots \text{(Expression 16)}$$

where: $t(2n\pi + 2\pi)$ and $t(2n\pi + \pi)$ are points of times at which " $m\theta + \Phi = 2n\pi + \pi$ " and " $m\theta + \Phi = 2n\pi + 2\pi$ " " $m\theta + \psi = 2n\pi + \pi$ " and " $m\theta + \psi = 2n\pi + 2\pi$ ", respectively; " $\omega_{mAV2}(n)$ " is the average value of " ω_m " sampled at these points of time; β is an appropriate gain; and $T_2(n) = t(2n\pi + 2\pi) - t(2n\pi)$
 $T_2(n) = t(2n\pi + 2\pi) - t(2n\pi + \pi)$.

Then, the time average value " ω_m " is equal to " $\omega_{mAV2}(n)$ " in the remaining half cycle of the rotation angle.

Please replace paragraph number [0041], with the following rewritten paragraph:

[0041]

Thus, "G" may be defined, in connection with the change in the angle " $m\theta + \psi$ " from 0 to 2π , by the following Expression 17:

$$G(n+1) = \beta \left(\sum_{k=1}^n \left(\frac{1}{T_1(k)} \int_{(2k\pi)}^{(2k\pi+\pi)} \omega_m dt - \omega_{mAV1}(k) \right) - \sum_{k=1}^n \left(\frac{1}{T_2(k)} \int_{(2k\pi+\pi)}^{(2k\pi+2\pi)} \omega_m dt - \omega_{mAV2}(k) \right) \right)$$

... (Expression 17)

When "G" is defined as described above, "G" converges to " $-m\theta$ " "ma" and the amplitude of " ω_m " becomes zero, as shown in Fig. 5(b).